

REMARKS

Applicants concurrently file herewith an Excess Claim Fee Payment Letter for seven (7) excess total claims and two (2) excess independent claims.

Claims 1-6 and 7-27 are all of the claims presently pending in the application. Claims 1-6 have been amended to more particularly define the invention. Claims 7-27 have been added to claim additional features of the invention.

It is noted that the claim amendments are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability. Further, Applicants specifically state that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Applicants gratefully acknowledge the Examiner's indication that claim 6 would be allowable if rewritten in independent form. Claim 27 has been added, which corresponds to claim 6 rewritten in proper independent form. However, Applicants respectfully submit that all of the claims are allowable.

Claims 1-5 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Scheurecker (U.S. Patent No. 4,007,822) and further in view of JP 10-2910590.

This rejection is respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

The claimed invention (e.g., defined by claim 1) is directed to a roll apparatus provided at a continuous caster for transferring a cast piece to a predetermined location. The roll apparatus includes at least three divided rolls arranged to align concentrically and in an axial direction thereof to constitute a roll forming a cast piece transfer path. At least one end portion of at least one of the divided rollers is supported by a cylindrical roller bearing of a full roller type, the cylindrical roller bearing including an outer ring member having a cylindrical outer diameter surface.

Conventional continuous casters are provided with roll groups, each including a set of long and short rolls arranged coaxially by bearings for pinching a cast piece which is drawn from a mold and is being transferred at upper and lower positions thereof. The roll groups are

aligned along a direction of transferring the cast piece. The roll groups are used as support rolls, guide rolls and pinch rolls. In order to absorb bending of the rolls accompanied by transferring the cast piece, self-aligning roller bearings or cylindrical roller bearings with aligning rings are used as bearings for rotatably supporting rolls constituting the respective roll groups around axis centers thereof. When the self-aligning roller bearing is used as a bearing for supporting the roll attached to the continuous caster, uneven wear caused by low speed and high load is produced. This reduces the load capacity of the roller bearing.

The claimed invention of exemplary claim 1, on the other hand, provides a roll apparatus provided at a continuous caster for transferring a cast piece to a predetermined location including at least three divided rolls arranged to align concentrically and in an axial direction thereof to constitute a roll forming a cast piece transfer path. At least one end portion of at least one of the divided rollers is supported by a cylindrical roller bearing of a full roller type, the cylindrical roller bearing including an outer ring member having a cylindrical outer diameter surface (e.g., see Application at page 5, line 23 through page 6, line 3). This feature is important for providing a roll apparatus having a high load capacity (see Application at page 2, lines 11-13).

II. THE PRIOR ART REFERENCES

The Examiner alleges that JP 10-2910590 would have been combined with Scheurecker to form the claimed invention of claims 1-5. Applicants submit, however, that these references would not have been combined and even if combined, the combination would not teach or suggest each and every element of the claimed invention.

That is, these references would not have been combined as alleged by the Examiner. Indeed, these references are directed to different problems and solutions.

Specifically, Scheurecker is directed to a strand guide having a relief means that is self-locking to prevent the strand parts from moving during unintended losses of pressure, whereas JP 10-209105 is merely directed to preventing the development of flaking caused by thermal expansion of a roll. Therefore, these references are completely unrelated, and no person of ordinary skill in the art would have considered combining these disparate references, absent impermissible hindsight.

Therefore, Applicants respectfully submit that one of ordinary skill in the art would

not have been so motivated to combine the references as alleged by the Examiner. Therefore, the Examiner has failed to make a prima facie case of obviousness.

Furthermore, neither Scheurecker nor JP 10-291059, nor any combination thereof, teaches or suggests a roll apparatus including a “*cylindrical roller bearing comprising an outer ring member having a cylindrical outer diameter surface.*” as recited in claim 1.

As noted above, unlike conventional roll apparatus for a continuous caster, the claimed invention provides a roll apparatus provided at a continuous caster for transferring a cast piece to a predetermined location including at least three divided rolls arranged to align concentrically and in an axial direction thereof to constitute a roll forming a cast piece transfer path. At least one end portion of at least one of the divided rollers is supported by a cylindrical roller bearing of a full roller type, the cylindrical roller bearing including an outer ring member having a cylindrical outer diameter surface (e.g., see Application at page 5, line 23 through page 6, line 3). This feature is important for providing a roll apparatus having a high load capacity (see Application at page 2, lines 11-13).

The novel features of the claimed invention are not taught or suggested by Scheurecker. The Examiner attempts to rely on Figure 1 of Scheurecker to support his allegations. The Examiner, however, is clearly incorrect.

Figure 1 of Scheurecker merely teaches a strand guiding means having a pair of opposite supporting rollers. The supporting rollers are each mounted on a frame by a plurality of roller carriers. A cast strand is disposed between the pair of opposite rollers.

Nowhere, however, in Figure 1 (nor anywhere else for that matter) does Scheurecker teach or suggest a roll apparatus provided at a continuous caster for transferring a cast piece to a predetermined location including a cylindrical roller bearing including an outer ring member having a cylindrical outer diameter surface. Indeed, Scheurecker merely depicts an upper supporting roller and a lower supporting roller having three divided pieces.

Moreover, the novel features of the claimed invention are not taught or suggested by JP 10-291059. The Examiner attempts to rely on JP 10-291059 as teaching a long and short roller supported by an independent cylindrical roller bearing on each roller.

JP 10-291059 merely discloses a cylindrical roller bearing with an aligning ring in which an outer diameter surface of an outer ring thereof moves in an axial direction to draw a curve, and fails to disclose using the cylindrical roller bearing including an outer ring member

whose outer diameter is cylindrical. The present Application describes adverse effects occurring due to the use of the aligning rings (see pages 1-2 of Application).

Therefore, we would submit that these references, even if combined, would not teach or suggest each and every element of the claimed invention.

III. NEW CLAIMS

New claims 7-27 have been added to claim additional features of the present invention and to provide more varied protection for the present invention. These claims are independently patentable because of the novel features recited therein.

Applicants respectfully submit that new claims 7-27 are patentable over any combination of the applied references at least for analogous reasons to those set forth above with respect to claims 1-5.

IV. FORMAL MATTERS AND CONCLUSION

In response to Examiner's objections, the claims have been amended in a manner believed fully responsive to all points raised by the Examiner.

In view of the foregoing, Applicant submits that claims 1-27, all of the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

Serial No. 10/611,678
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The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

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